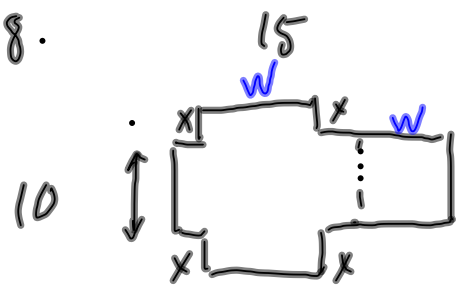
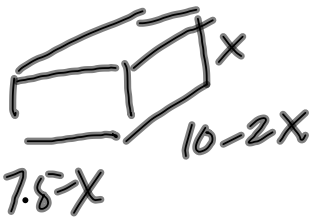
18.





$2x + 2w = 15$

$2w = 15 - 2x$

$w = \frac{15-2x}{2}$

$w = \frac{15}{2} - x$

$w = 7.5 - x$

$0 \le x \le 5$

domain

$V = \left(\frac{15-2x}{2}\right)(10-2x)\,x$

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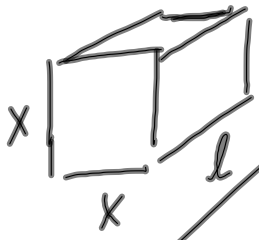
30.



girth $= 4x$

$4x + l \le 108$

max volume

$V = l \cdot x \cdot x$

$l = 108 - 4x$

$V = (108 - 4x)x^2$

$V = 108x^2 - 4x^3$

$V' = 216x - 12x^2 = 0$

$x(216 - 12x) = 0$

$x = 0$ $\quad 216 - 12x = 0$

$18 = \frac{216}{12} = 12x$

$V(18) = 108 \cdot 18^2 - 4 \cdot 18^3$

$= 11{,}664\ m^3$

2nd der test

$216 - 24x \,|_{x=18}$

$216 - 24 \cdot 18 = -216$

max

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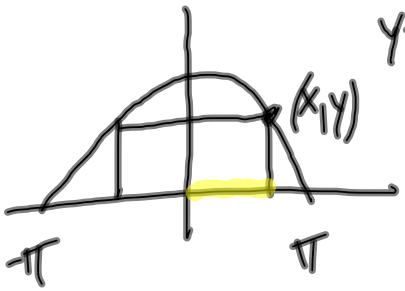
21.



$y = 4\cos(.5x)$

$A = b \cdot h$

$b = 2x$

$h = 4\cos(.5x)$

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4.4 b more optimization!

hints: draw pic, label variables
write equations that relate the variables. need equation for the thing you optimize. (in terms of variable)

substitute

c.p., e.p., 1st or 2nd der test ...

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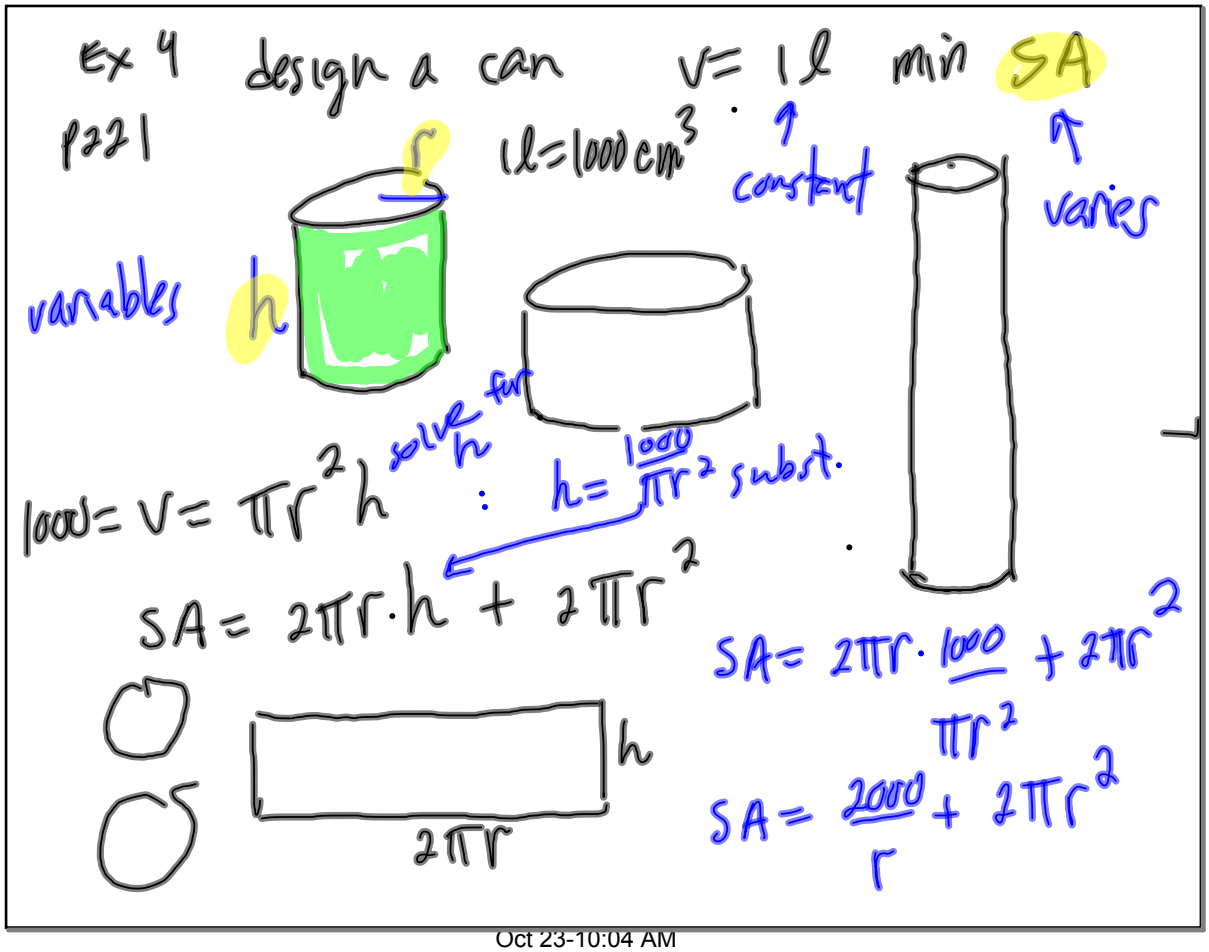

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